Introduction to GIS

through Quantum GIS

Day 1: Software Day

offered by Valley Stewardship Network

taught and prepared by Legion GIS, LLC

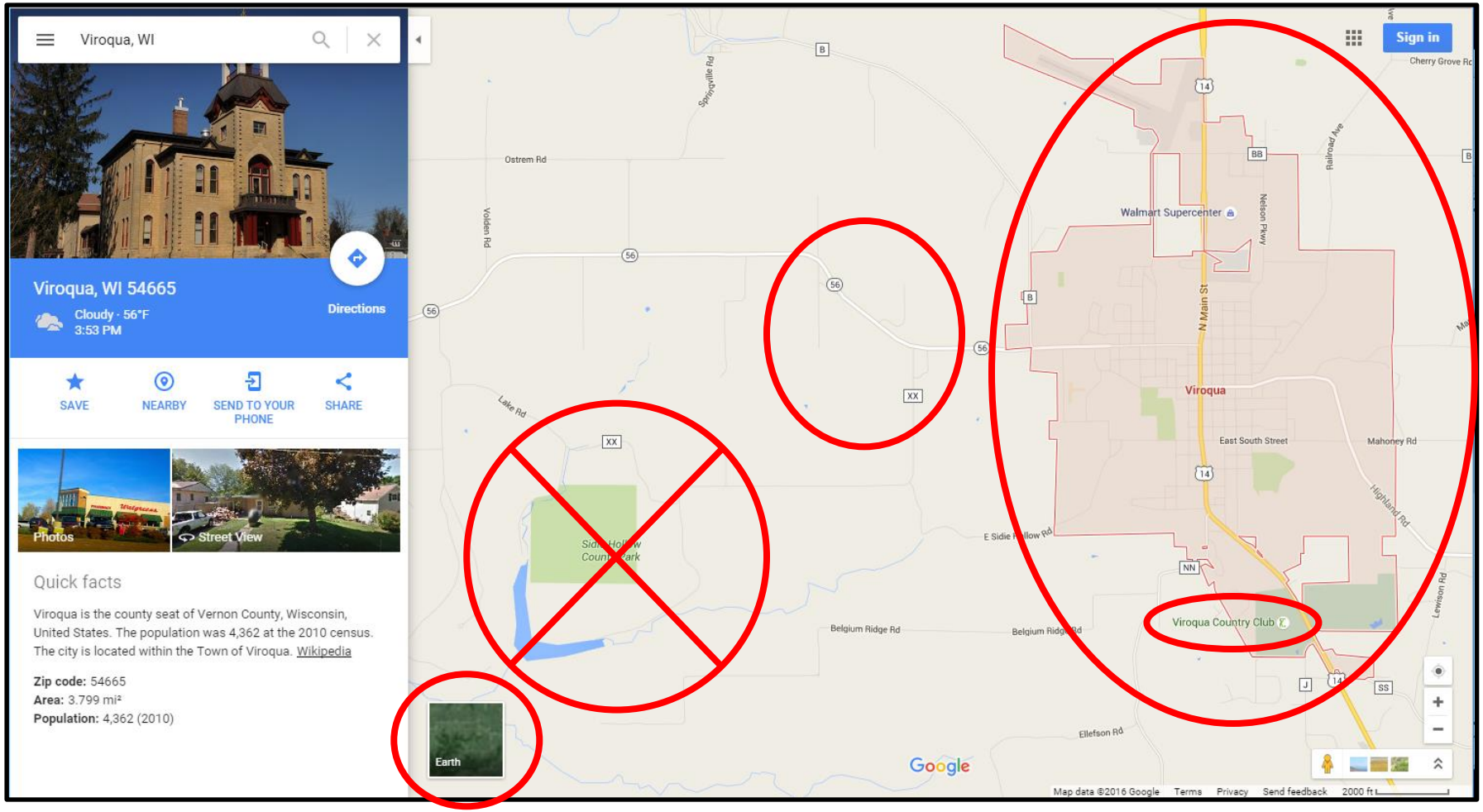
July 2016

What is (a) GIS?

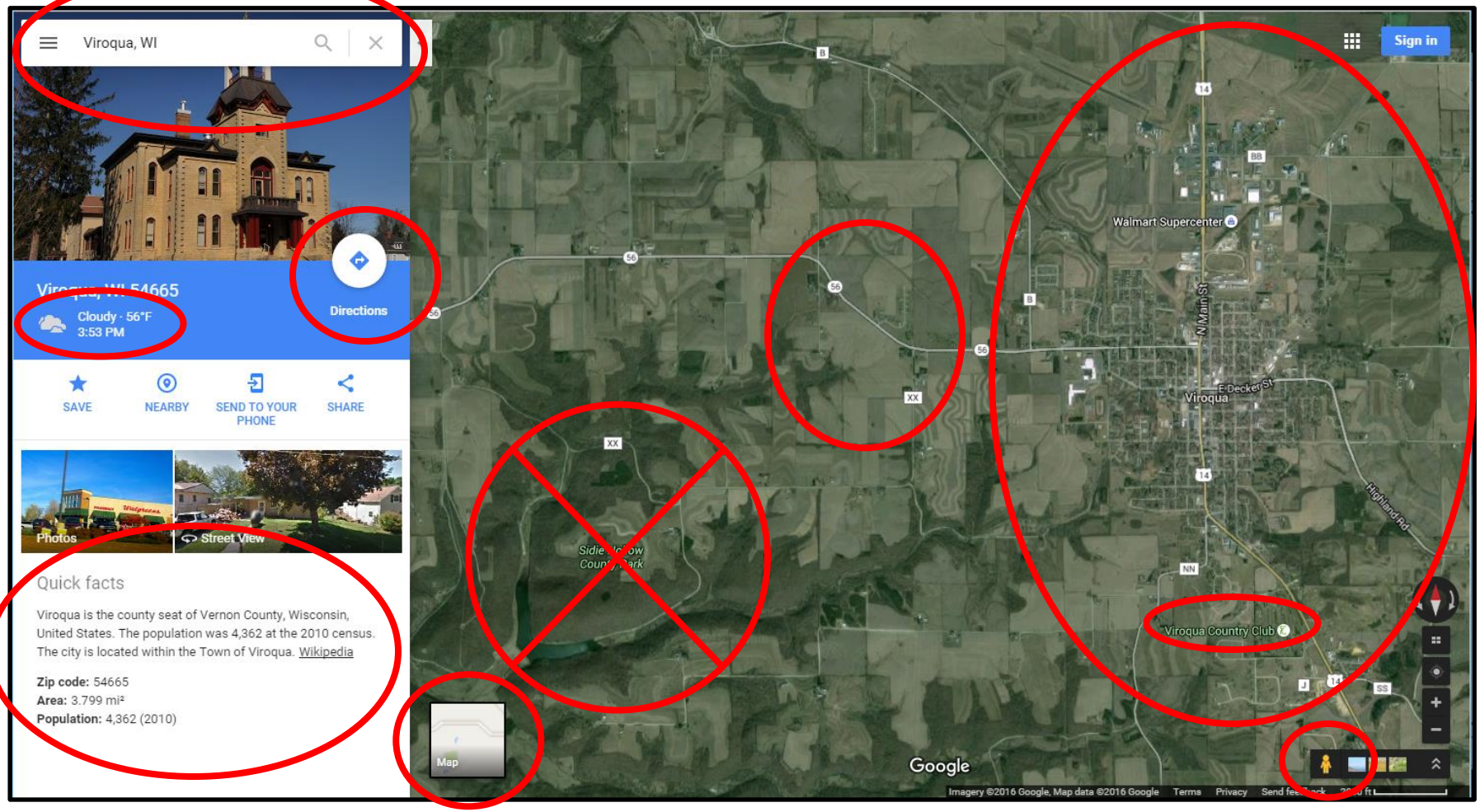
Geographic Information System =
a map that is also a database, i.e. a **spatial database**

Here's an example we're all familiar with…

google maps = a super fancy GIS



google maps = a super fancy GIS



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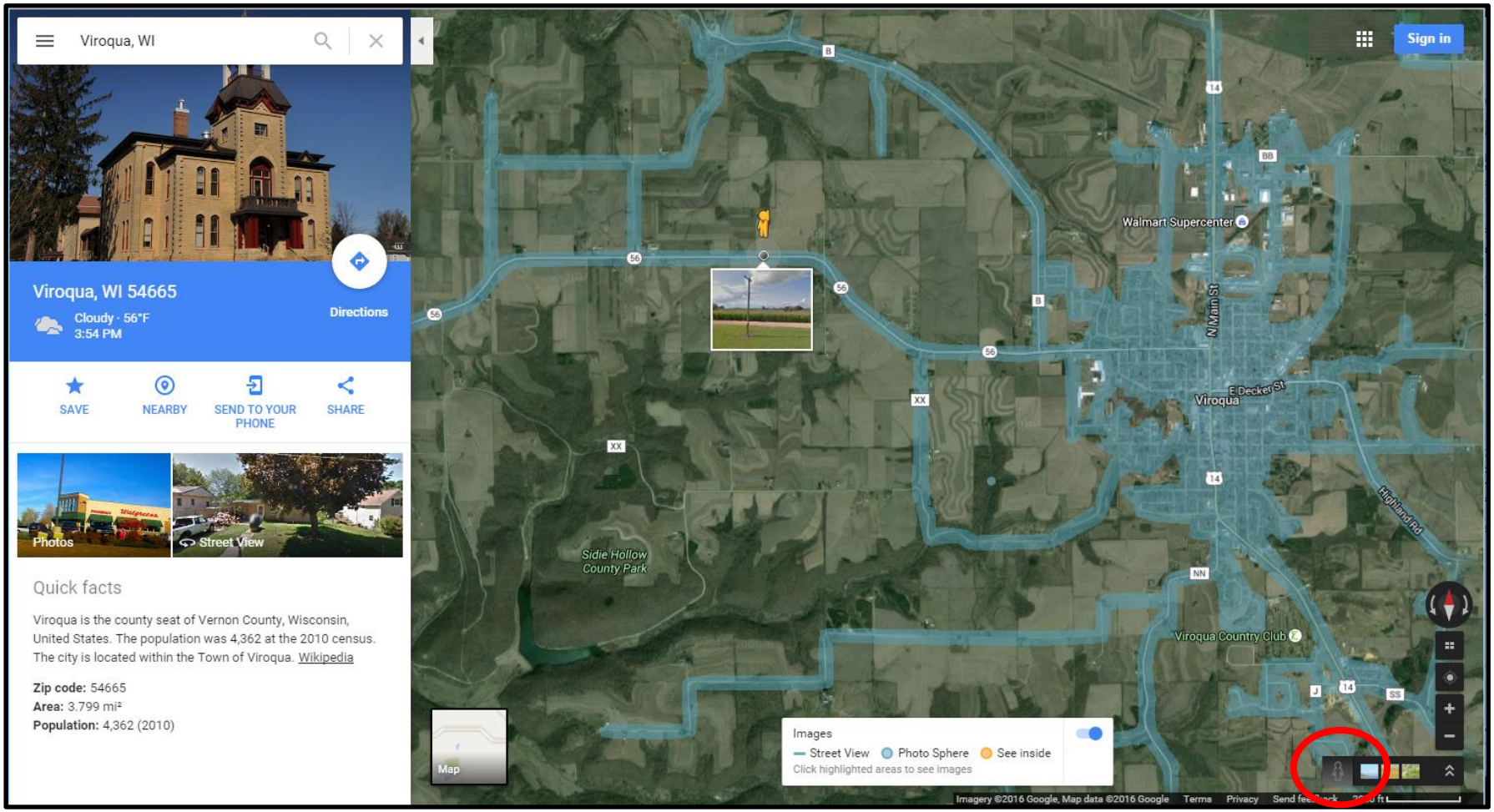
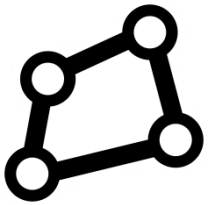


data

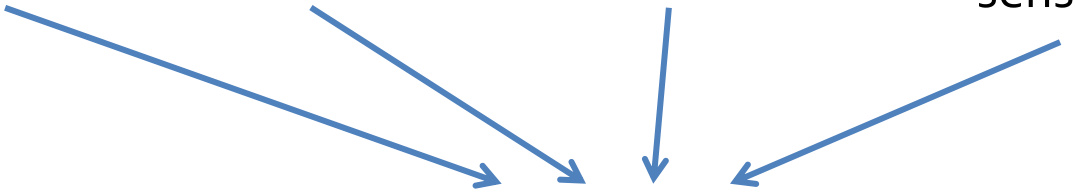


shapefiles

spreadsheets

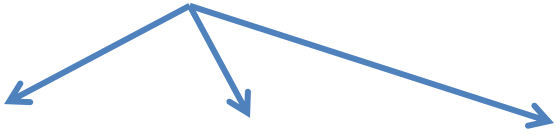
satellites/GPS

planes/remote sensing



processing

this is technically the "Geographic Information System" part…



publishing

web-map

real map

mobile app

data

shapefiles

spreadsheets

satellites/GPS

planes/remote sensing

processing

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publishing

web-map

real map

mobile app

Another way to look at the steps involved…

- Data management
  - Creation, collection, acquisition
- Data analysis
  - Modeling, comparison, processing
- Data interpretation
  - Visualization, publication, dissemination

…and there is software all along the way.

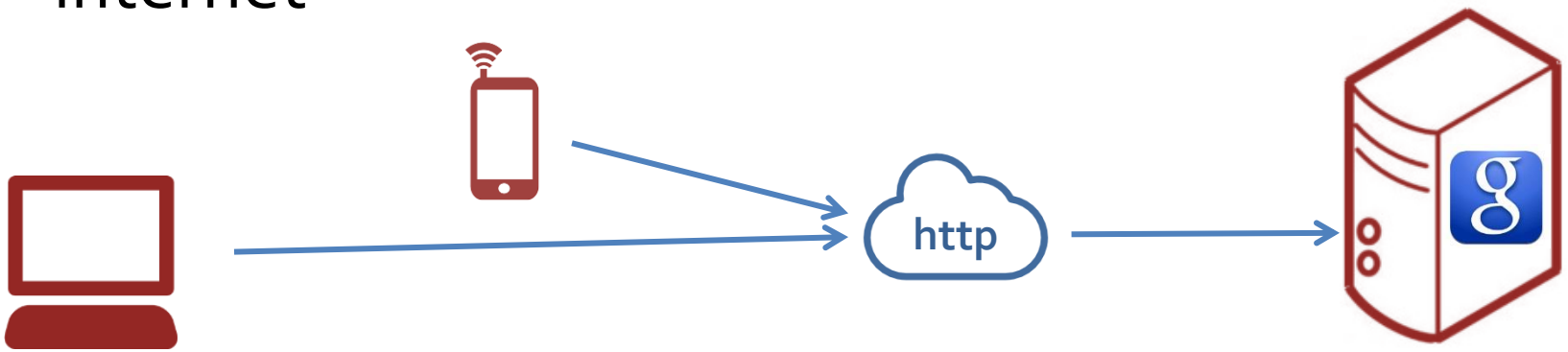
- GPS unit accompanying software for collection/correction
  - Trimble PathFinder, etc.
- Software for processing remote sensing products
  - LASTools (for raw LiDAR data), ENVI (for image processing)
- Purely analysis-based software
  - GRASS GIS (for modeling), various Python or R modules
- Mapping software
  - ESRI's ArcGIS (with extensions for all kinds of processes), Quantum GIS (with plugins), GRASS (for modeling), MapInfo, OpenJUMP, TileMill (for style and creating tiled image)
- Any number of web-related technologies
  - OpenLayers, Leaflet, GeoServer, MapServer, CartoDB, MapBox, GeoDjango

In a lot of ways, it's pretty much just IT.

Desktop vs. Server-Side software

- Desktop is installed and used on your computer

- Server-side software is installed on a server somewhere, and you access it through the internet



About software development and licensing:

Open Source vs. Proprietary

FOSS (Free and Open Source Software)

- developed in the public domain
- anyone can use it, contribute, or create plugins
- published under one of many open source licenses
- free

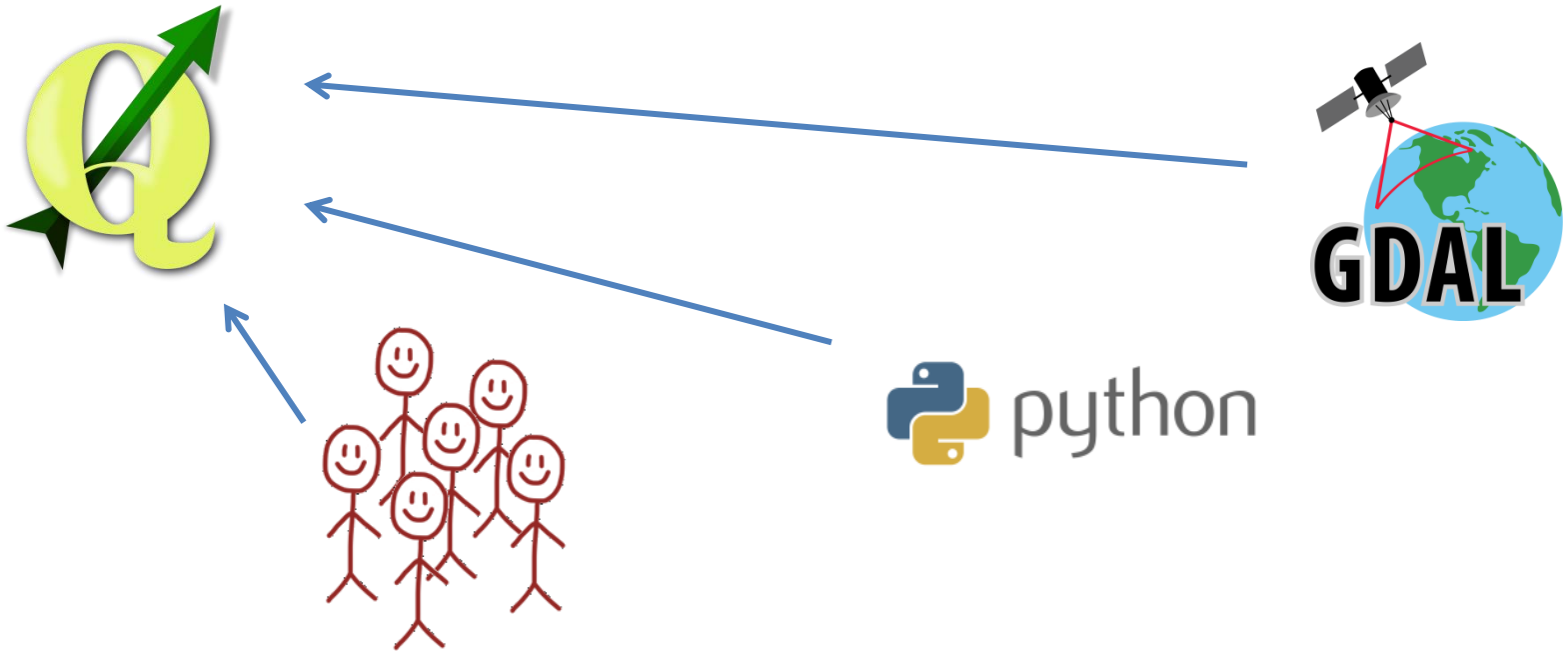
Proprietary Software

- developed and copyrighted by an entity
- licensing and use depend on the product
  (e.g. MS Office business license vs. home license)
- generally not free, potentially very expensive

Open source technology encourages interoperability between platforms and software… no real incentive to create completely stand-alone applications. For example:

Quantum GIS

- *Uses GDAL/OGR tool libraries*
- *Allows for close integration with Python programming language*
- *Supports the integration of plugins created by people anywhere*



Proprietary vs. open extends to data:

But open data is everywhere!

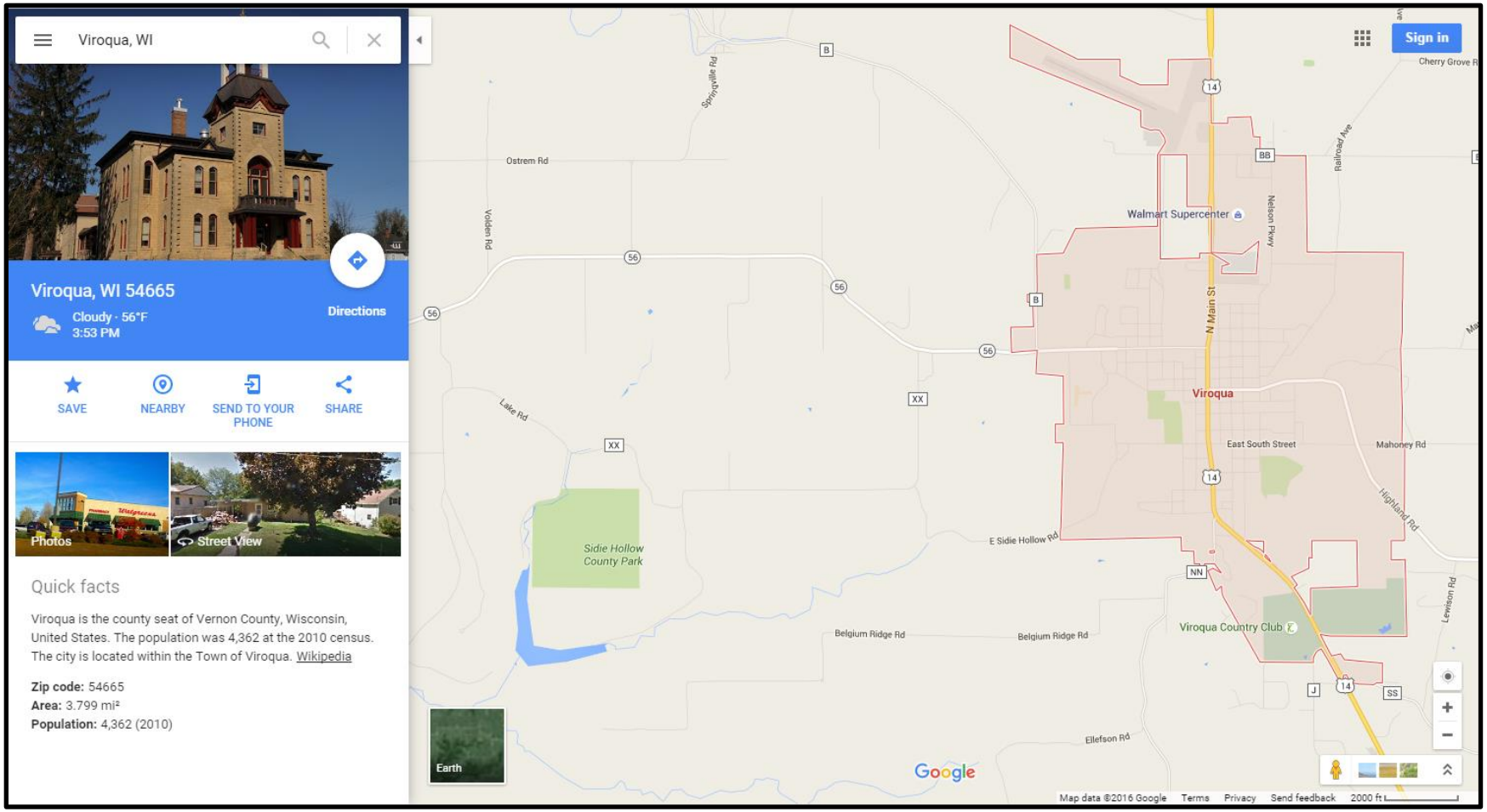
Open data

- e.g. the majority of US government data
- accessible to the public
- free, or small "time and materials" fees

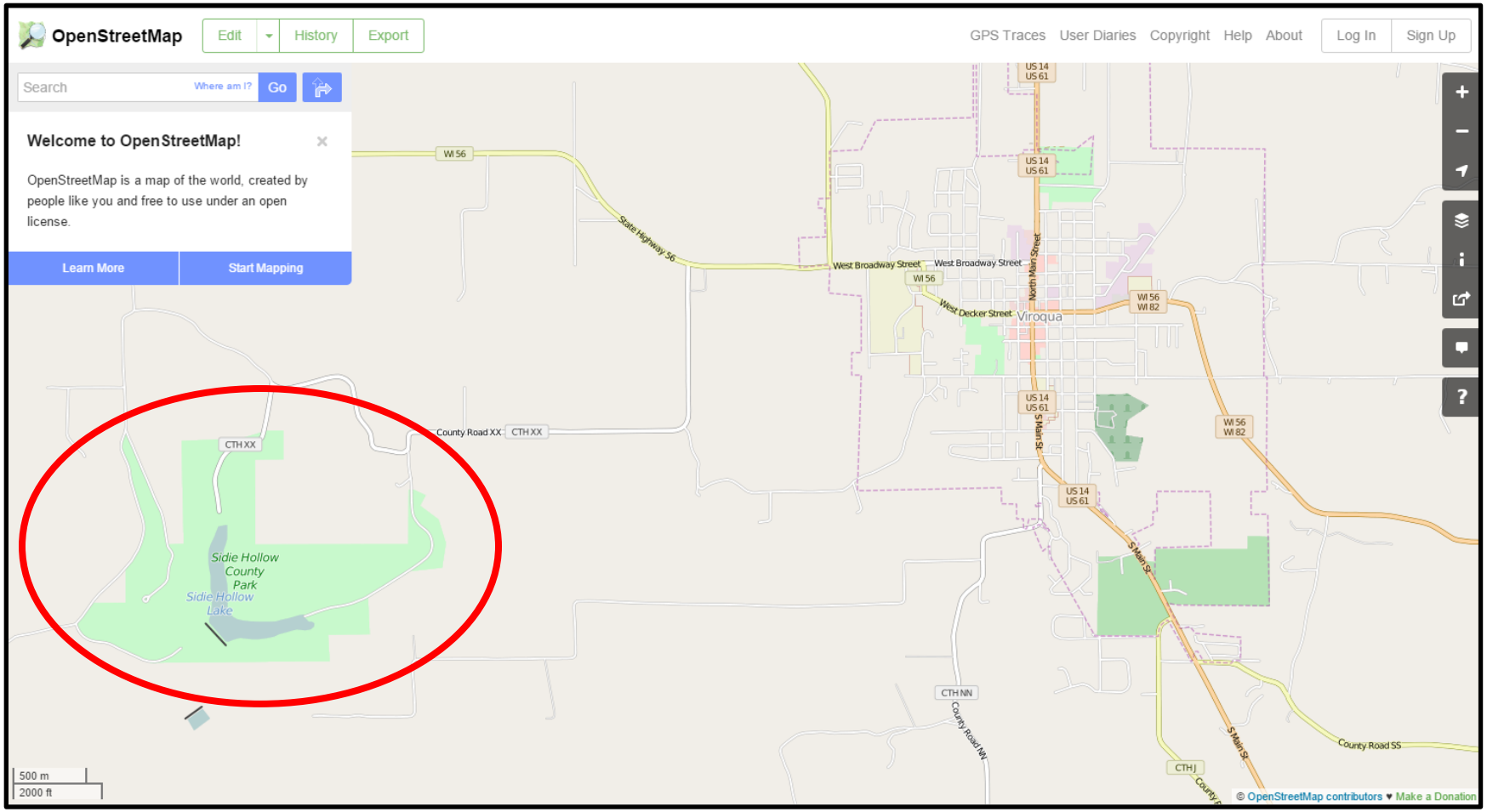
Proprietary Data

- e.g. an energy company's customer address list
- not accessible to the public (in raw format)
- if it is accessible, generally not free

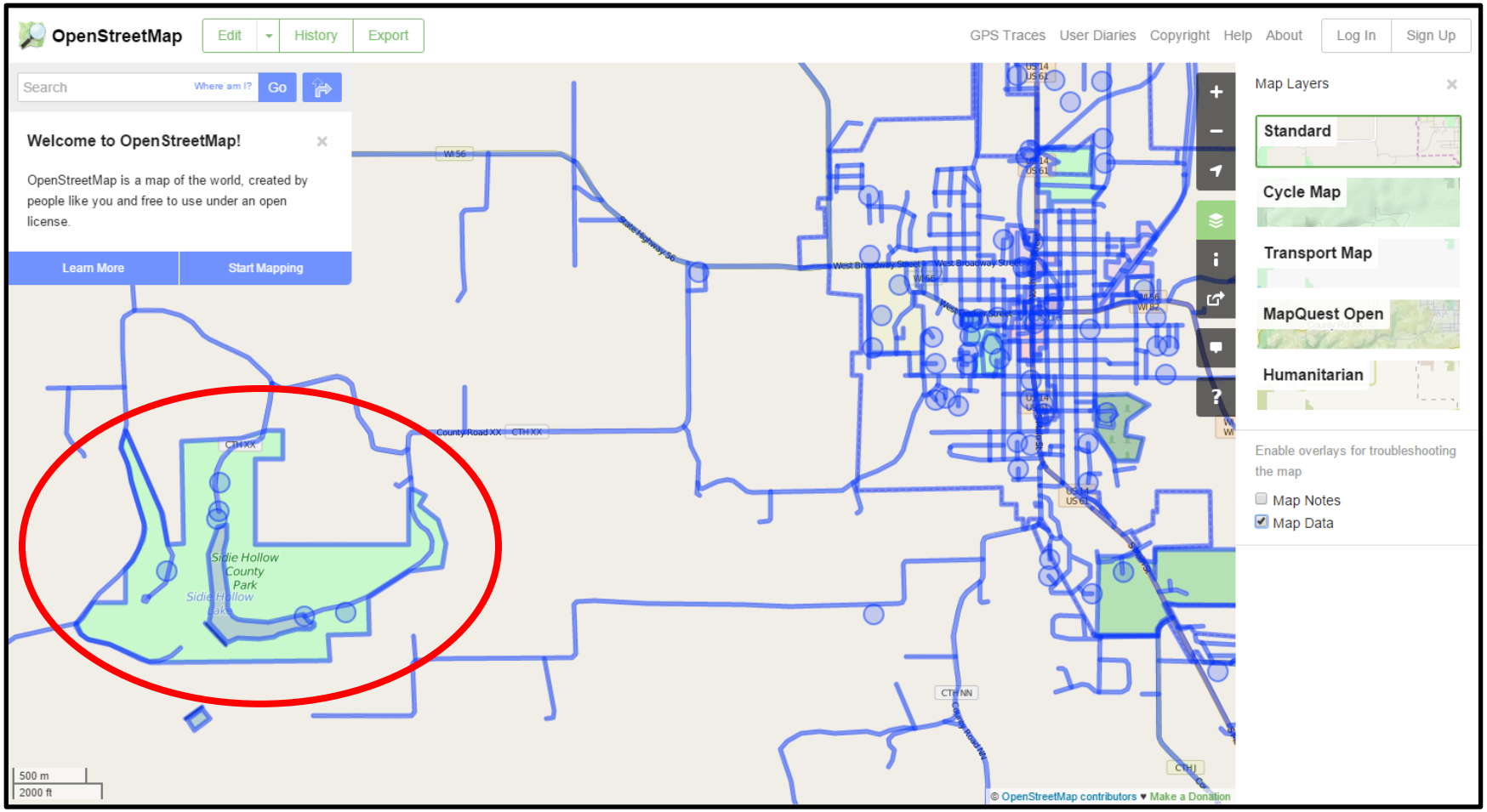
google maps = a proprietary GIS

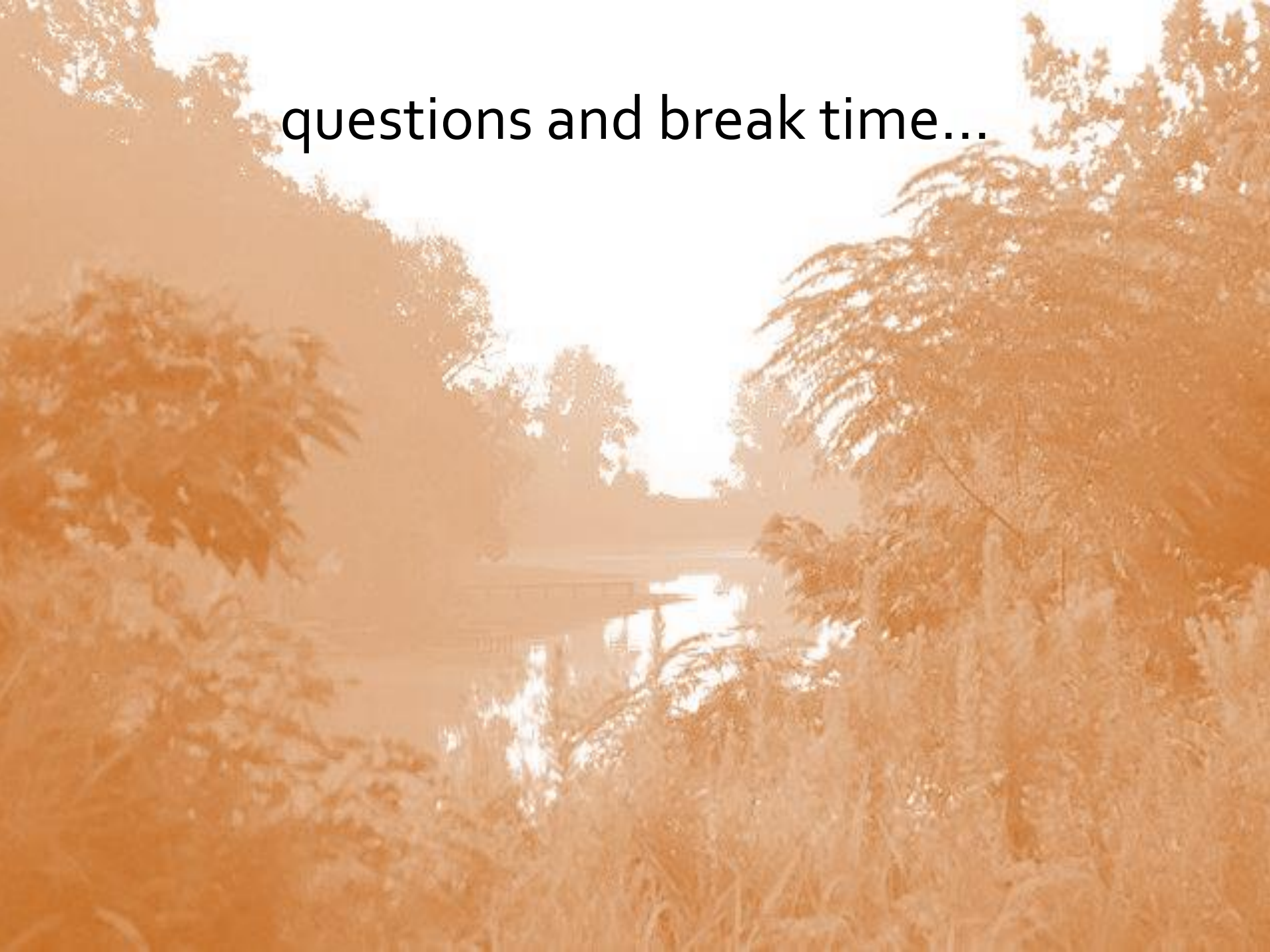


open street map = an open GIS



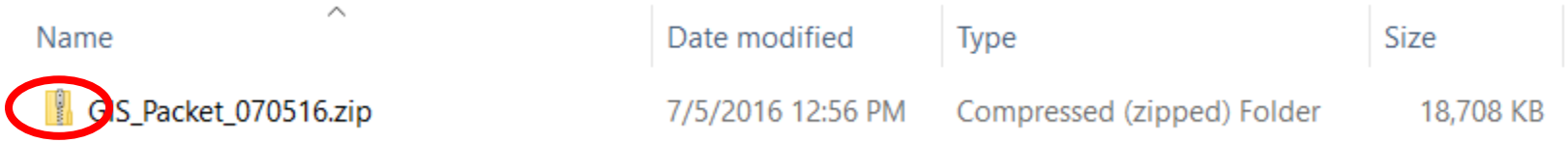
…anyone can enter or correct data



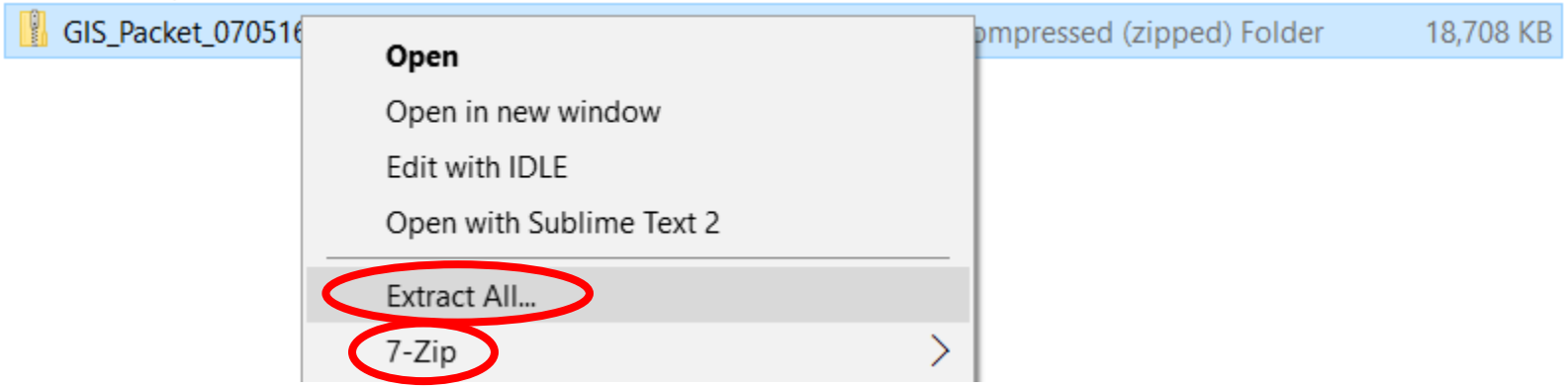

questions and break time…

Quick note on zip files!

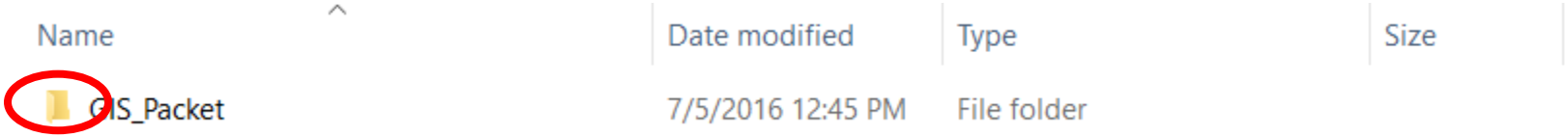
- Zip Files are compressed folders that must be "unzipped" before you can use them.



- Right-click on the file to unzip

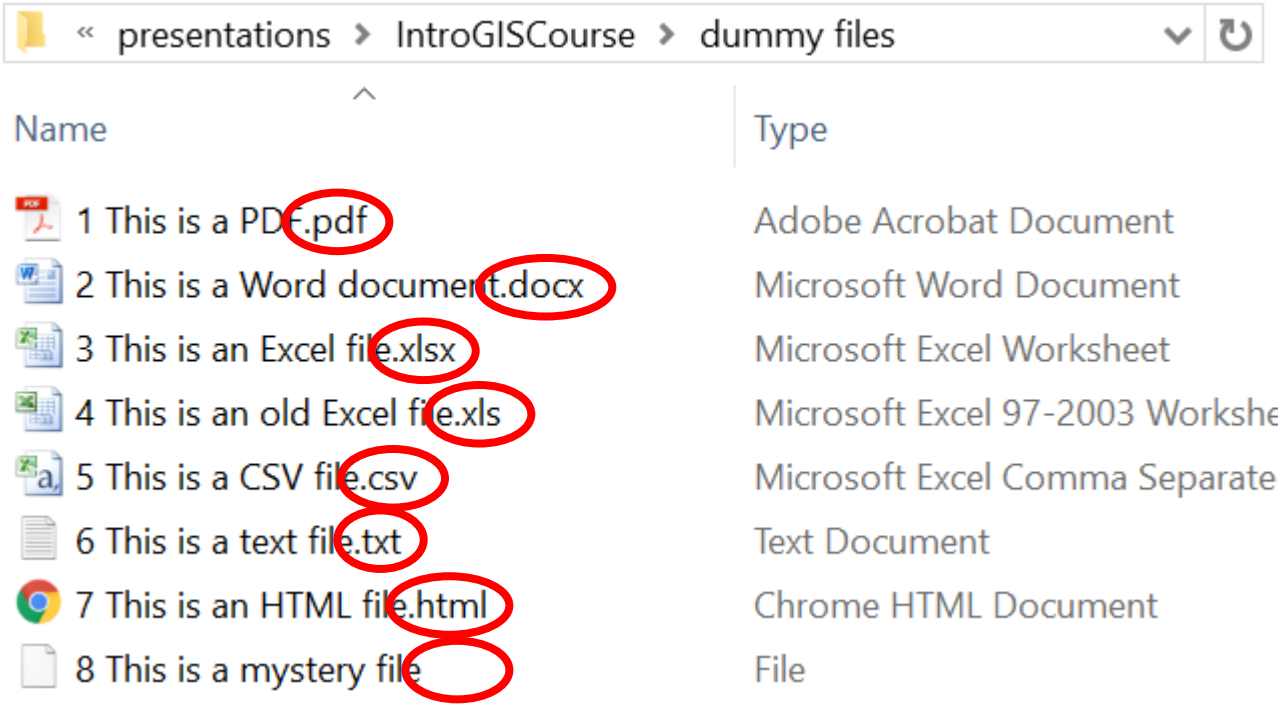


- Once unzipped, the normal "folder" icon will be used



Quick note on file extensions!

- File extensions are the part of the filename that tell your computer how to interpret the file, i.e. what program to use to open it.



- Again, GIS is basically data storage and interpretation.